

Policies and Options for Encouraging Wind Energy

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Presentation

- Overview of Wind Energy in Michigan
- Policy Issues
- Opportunities
- Challenges

Why Wind?



- **Reduce air pollution from fossil electricity sources**
- **Increase manufacturing base, as well as provide rural and farm income**



Why Wind?

- **Gain energy independence**
- **Reduce energy costs over the long run**



Wind Energy Potential....

THE TOP TWENTY STATES for Wind Energy Potential

as measured by annual energy potential in the billions of kWh, factoring in environmental and land use exclusions for wind class of 3 and higher.

	B kWh/Yr		B kWh/Yr
North Dakota	1,210	11. Colorado	481
Texas	1,190	12. New Mexico	435
Kansas	1,070	13. Idaho	73
South Dakota	1,030	14. Michigan	65
Montana	1,020	15. New York	62
Nebraska	868	16. Illinois	61
Wyoming	747	17. California	59
Oklahoma	725	18. Wisconsin	58
Minnesota	657	19. Maine	56
Iowa	551	20. Missouri	52

Source: An Assessment of the Available Windy Land Area and Wind Energy Potential in the Contiguous United States, Pacific Northwest Laboratory, August 1991. PNL-7789

Michigan Wind Electric Potential (Installed Capacity)

Developable*

16,560 MW

Class 3 +

830 MW

Class 4 +

110 MW

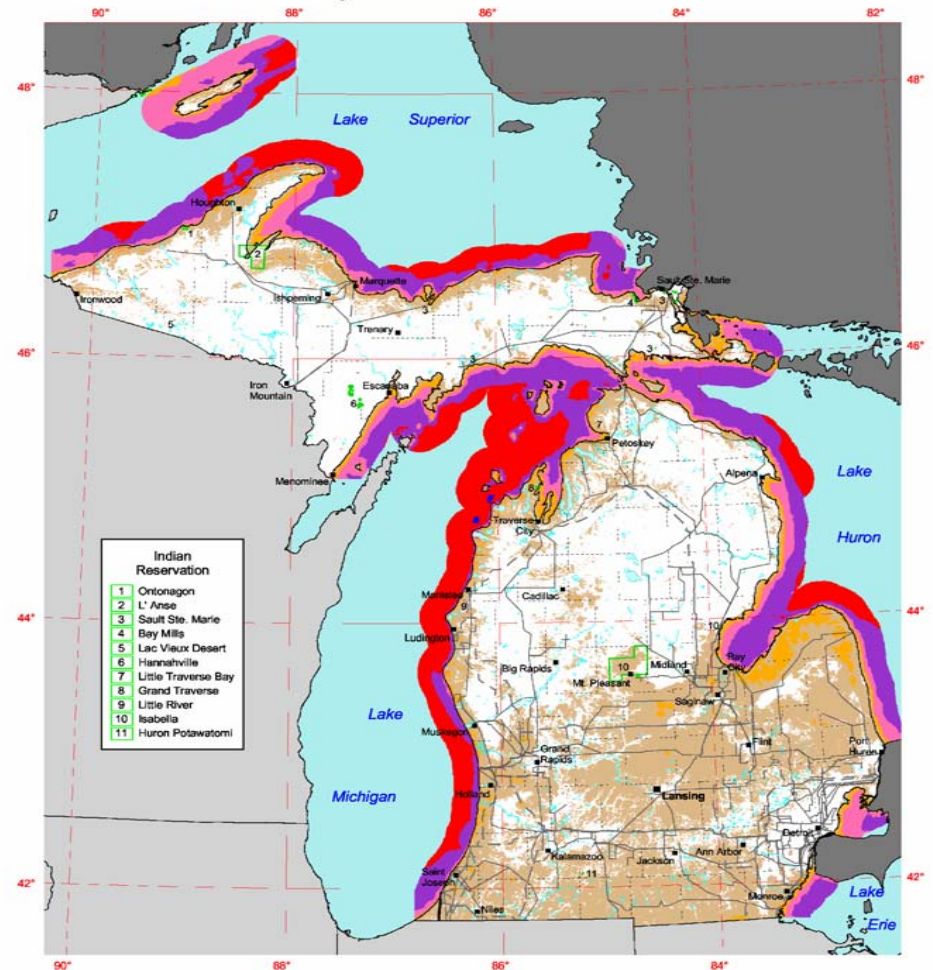
Class 5 +

13 MW

Class 6 +

Excludes urban areas,
national/state parks, wetlands,
slopes >20%, etc.

Michigan - 50 m Wind Power



The annual wind power estimates for this map were produced by TrueWind Solutions using their Mesomap system and historical weather data. It has been validated with available surface data by NREL and wind energy meteorological consultants.

Wind Power Classification				
Wind Power Class	Resource Potential	Wind Power Density at 50 m W/m ²	Wind Speed ^a at 50 m m/s	Wind Speed ^a at 50 m mph
1	Poor	0 - 200	0.0 - 5.6	0.0 - 12.5
2	Marginal	200 - 300	5.6 - 6.4	12.5 - 14.3
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7
7	Superb	> 800	> 8.8	> 19.7

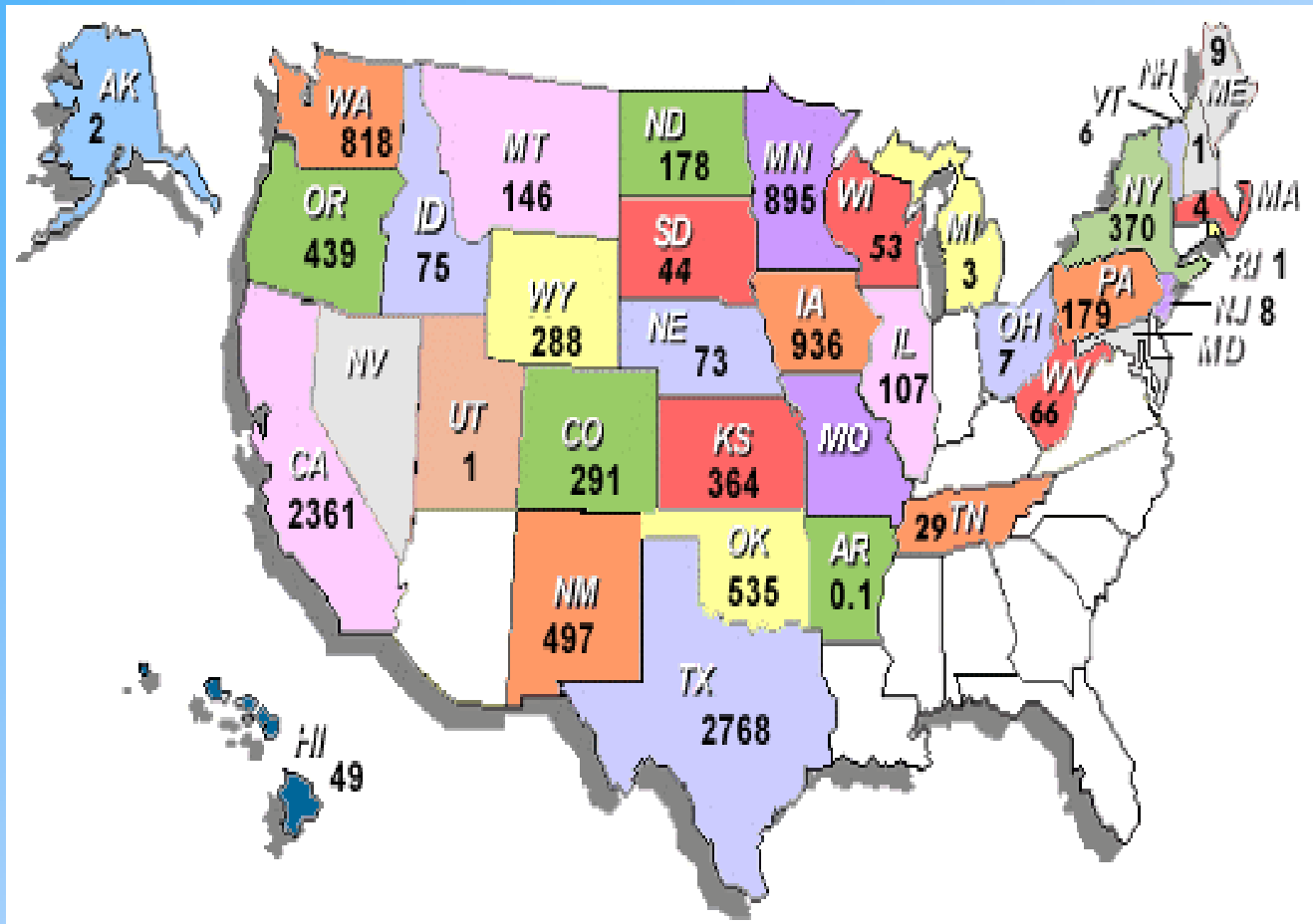
^a Wind speeds are based on a Weibull k of 2.0.

Transmission Line ^a	
Voltage (kV)	
138	—
230	—
345	—
765	—

^a Source: POWERmap, 6/2004
PHEA, a Division of the Midwest-Hill Companies

U.S. Department of Energy
National Renewable Energy Laboratory

Does not determine where wind energy is installed....



State/Rank	MW
1. Texas	2768
2. California	2361
3. Iowa	936
4. Minnesota	895
5. Washington	818
6. Oklahoma	535
7. New Mexico	497
8. New York	370
9. Oregon	439
10. Kansas	364
11. Colorado	291
12. Wyoming	288
13. Pennsylvania	179
14. N. Dakota	178
15. Montana	146
16. Illinois	107
17. Idaho	75
18 Nebraska	73

TOTAL INSTALLED U.S. WIND ENERGY

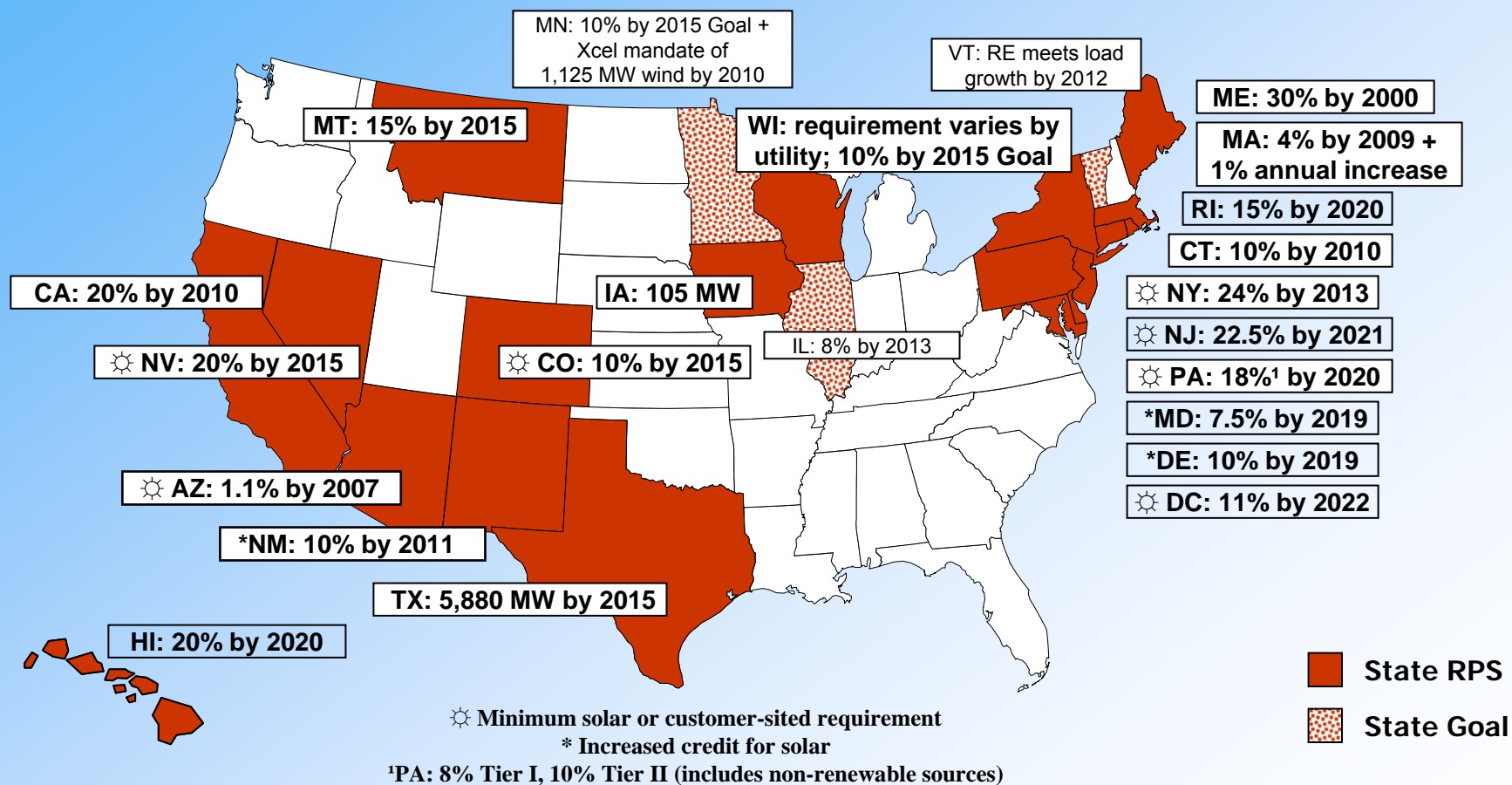
CAPACITY: 11,603 MW as of December 31, 2006

Source: American Wind Energy Association

Current State-Level Policies supporting Wind and other Renewable Energy

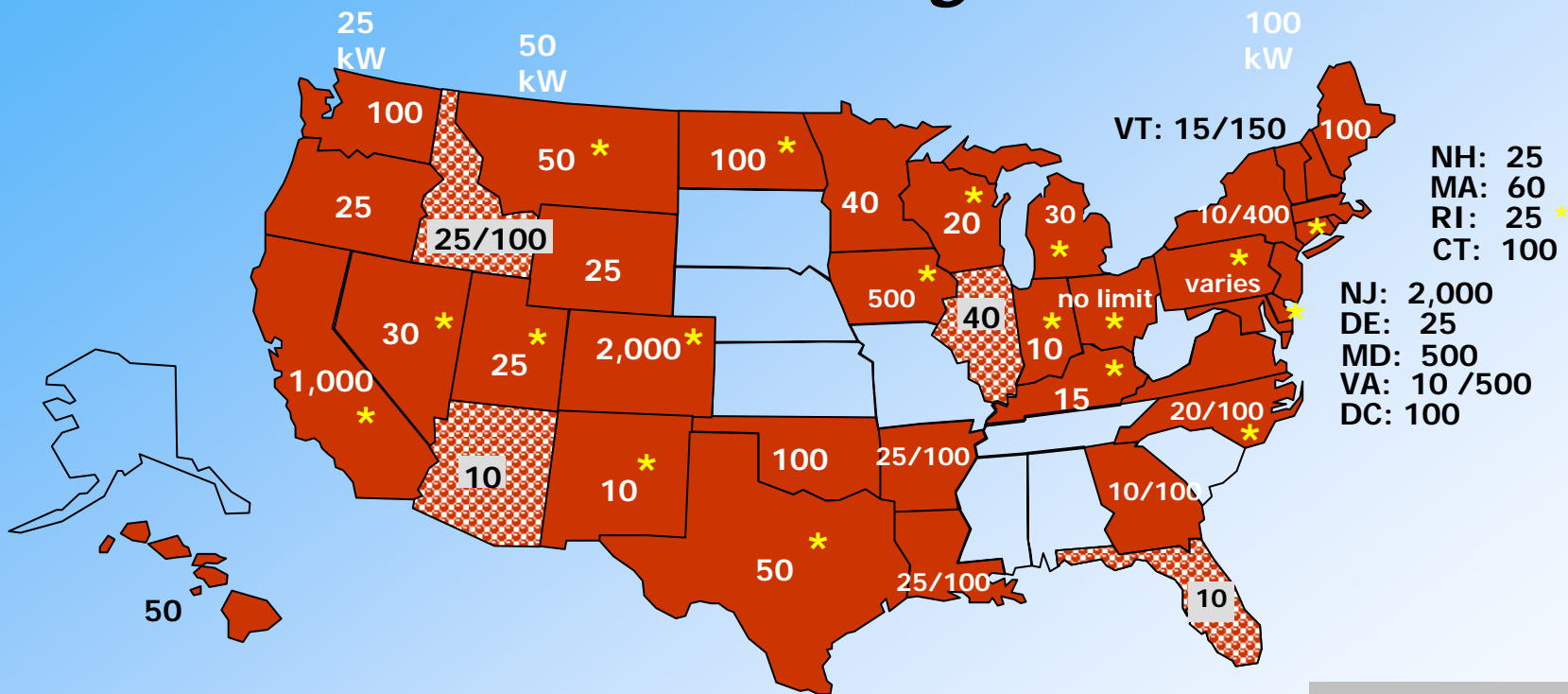
- Renewable energy standards – 22 states plus D.C.
 - Mandate utilities to purchase a certain percentage of energy from renewable sources
 - Supports utility scale renewable production
- Net metering – 40 states (supports primarily small wind)
- Grant/loan/rebate programs – 26 states
 - Helps to offset cost of installation, can pair with federal programs

Renewables Portfolio Standards



22 states + DC

Net Metering Rules



**Net metering is
available in
40 states + D.C.**

#s indicate system size limit (kW); in some cases limits are different for residential and commercial as shown

Michigan Policies

- Net metering limited to less than 30kW
- Customer receives 3.5 – 6 cents credit retail value for each kWh produced that goes to utility
- Net excess generation (NEG) credited monthly for 12 months
- Utility keeps any additional NEG at the end of the year
- **Currently serious interconnection hurdles**

Michigan Policies, cont.

- Currently no state policies to provide support to utility-scale or community wind projects
- MPSC requires Consumers and DTE to have a renewables program
- No state grants or loans available specifically to promote renewable energy

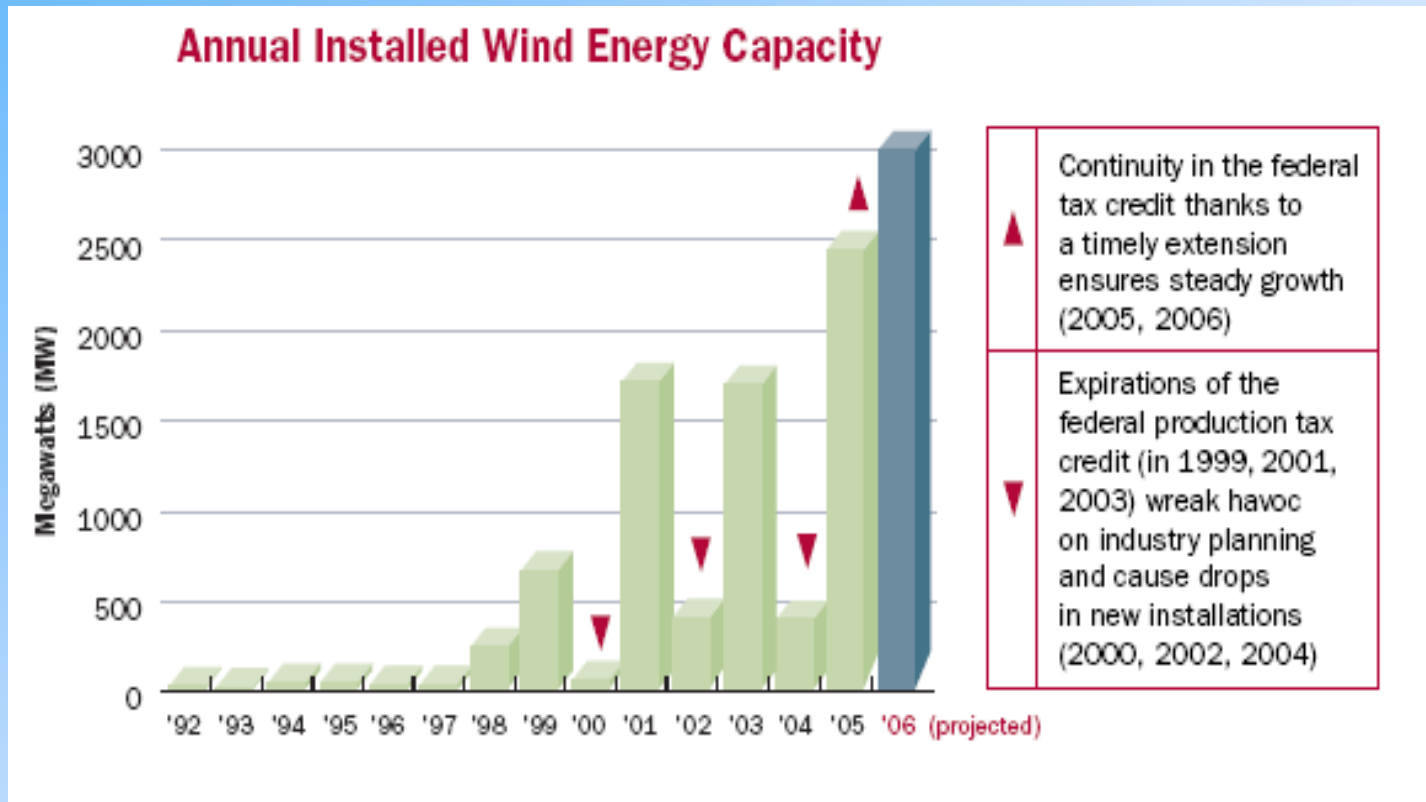
Current Federal Policies Supporting Wind/Renewable Energy

- Production Tax Credit for Utility Scale Wind
 - 1.9 cents/kWh for 10 years
 - Only accrues to corporate entities (C- and S-corps, LLCs)
 - Extended through Dec 31, 2008
 - Makes wind energy investment attractive to corporations

2002 Farm Bill

- \$12 million in 2007 to cost-share renewable energy production for farms and rural small businesses

Impact of U.S. Energy Policy (Production Tax Credit)



Source: American Wind Energy Association

Overview of study

- Based on 50,000 MW assumption (which would be about 10% of U.S. electricity needs)
 - Current wind installations – just over 10,000 MW
- Matched wind turbine components with NAICS codes, then looked at Census data to see where these components were already being built

2002 Farm Bill Funds

- Of the nearly \$68 million granted since 2003
 - 45% has gone to three states:
 - Minnesota (20%)
 - Iowa (13%)
 - Wisconsin (11%)
 - 41% has gone to large-scale wind projects
- States with favorable renewable policies seem more likely to apply for and receive these funds

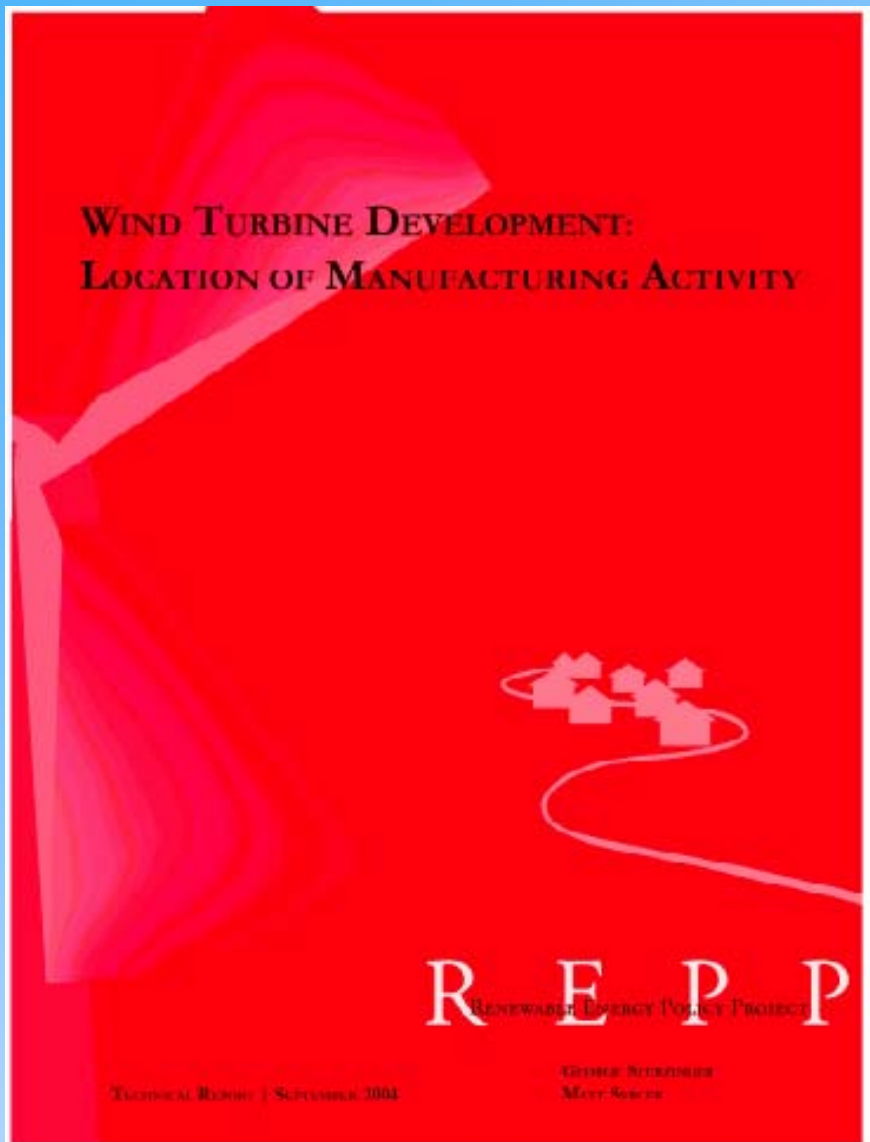
Policies lead to jobs.....

2006 Wind Manufacturing Openings

- Gamesa (Spain)
 - Turbine blade plant in Pennsylvania, nearly 250 permanent jobs
- Clipper WindPower (U.K), offices in CA, MD, CO, Mexico and the U.K,
 - \$22 million turbine plant in Cedar Rapids, IA, added 140 jobs
- Sulzon (India)
 - Turbine blade and nose cone manufacturing facility in Pipestone, MN, added 125 jobs

Michigan Manufacturing Potential

- Showed that Michigan rated highly in U.S. for turbine manufacturing



Available at:

<http://www.repp.org/articles/static/1/binaries/WindLocator.pdf>

State by State Results

Location	# of Firms	Millions \$	New Jobs
California	1,918	2,350	14,147
Ohio	1,045	1,925	13,215
Wisconsin	538	1,677	11,335
Illinois	912	1,660	11,303
Indiana	603	1,681	11,186
→ Michigan	957	1,468	10,369
Texas	952	1,593	10,000
Pennsylvania	821	1,412	9,029
New York	730	1,357	7,876
North Carolina	415	819	4,897

Overall Results for Michigan

NAICS Description	# Firms in NAICS	Millions \$ Investment	New Jobs
All Other Plastics Product Manufacturing	584	\$510.2	4,064
Iron Foundries	63	\$355.3	2,491
Speed Changer, Industrial	17	\$246.7	1,670
Fabricated Structural Metal	121	\$182.5	1,047
Power Transmission Equip.	22	\$62.0	405
Electronic Equipment and Components, NEC	34	\$43.8	284
Measuring and Controlling Devices	54	\$23.9	158
Motors and Generators	23	\$21.1	128
Ball and Roller Bearings	8	\$12.8	77
Printed circuits and electronics assemblies	21	\$4.8	20
Turbines, and Turbine Generators, ...	2	\$2.4	8
Industrial and Commercial fans and blowers	8	\$2.3	17
Totals:	957	\$1,467.9	10,369

Wind Developments In Michigan

- Thumb Area – Three pending developments; two from Noble Energy (158 and 36 MW), and one from John Deere (50 MW)
- Major delay in MISO (grid access), requires \$14 million in transmission line upgrades
- Interconnection hurdles
- Hoped to have turbines running in 2006, now delayed until mid-2007 or later
- Proposed Oceana County wind farm for 2008 – 50 MW

Community-owned, utility-scale projects

- Usually just a few turbines (2- 6 MW total)
- Owned by farmers or community members who form a cooperative or an LLC, get equity investors
- New interest on the part of investment companies: e.g. John Deere Credit
- Can have much higher rates of return than lease-agreement arrangement

Scenario in MN – New community, farmer-owned wind projects



Luverne, MN, September 30, 2004

One of 7 new 1.5 KW turbines, in addition to 4 turbines already existing

MinWind I, II and III – farmer/investor LLC

Challenges to Farmer-Owned Utility-Scale Wind in Michigan

- Grid availability – large developers and other energy providers are already in line
- No current state policies in MI to encourage utilities to purchase renewable energy
- Uncertainty with local zoning regulations – variety of issues arise as wind energy becomes more prevalent

MSU's Wind Energy Education

- 2007 State Energy Office Grant
- Focus on Farmer-Owned, Community Wind
- Several producer groups are interested and are pursuing
- Work with groups to develop plans for starting community wind venture

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MSU Wind Energy Website:

<http://web1.msue.msu.edu/wind>